

CLAIMS

1. An electrolytic system comprising:

5 a container for an electrolyte arranged such that electrolyte contained therein forms an electrical circuit;

10 a commutator comprising a pair of input electrodes which are arranged to be immersible in electrolyte contained within the container and further arranged to receive an AC electrical signal at said pair of input electrodes, and to convert said AC electrical signal to a DC signal at two points in the same electrolyte;

15 a controller for controlling movement of said commutator and a waveform of said applied AC voltage such that said movement of the commutator and said waveform of said applied AC voltage have a predetermined relationship; and

20 a set of working electrodes arranged to be immersed in the electrolyte contained in the container and further arranged to pass a current therebetween.

2. An electrolytic system as claimed in claim 1 in which the system comprises a pump arranged to pump electrolyte through the system.

25 3. An electrolytic system as claimed in claim 1 in which the container comprises a series of interconnected tubes.

4. An electrolytic system as claimed in claim 3 in which the ratio of the length of each tube to their cross-sectional area is as large as possible.

30 5. An electrolytic system as claimed in claim 1 in which the controller is arranged to generate a signal which is used to control the waveform of the AC signal so that it is synchronous with the movement of the commutator.

6. An electrolytic system as claimed in claim 2 in which said DC signal comprising a positive DC voltage, which forms a "+ve virtual electrode" and a negative DC voltage, which forms a "-ve virtual electrode", the system being further
5 arranged such that said DC signal is applied across the working electrodes and further such that said pump is used to produce a steady flow of electrolyte from said +ve virtual electrode to said -ve virtual electrode and from said -ve virtual electrode to said +ve virtual electrode.

10 7. An electrolytic system as claimed in claim 6 in which flow of electrolyte from the working electrodes are combined at the input of the pump.

8. An electrolytic system as claimed in claim 1 in which said working electrodes comprise a gas porous membrane.

15 9. An electrolytic system as claimed in claim 1 in which said working electrodes are arranged such that an ionic species within an electrolyte contained within the container can be connected at the working electrodes such that the resulting faradaic current flowing in the electrolyte flows in the same direction as the flow of
20 electrolyte within the container.

10. A commutator comprising at least a first and a second plate arranged to move relative to one another, one of said plates comprising at least one input port arranged to allow a fluid to enter the commutator and one of said plates comprising at least
25 one output port arranged to allow a fluid to exit the commutator, and at least one of the plates comprising at least one connector, which is capable of connecting said at least one input port to said at least one output port, wherein said plates are arranged such that, as the plates move relative to one another, the connector periodically connects the input port to the output port.

30 11. A commutator as claimed in claim 10 in which said at least one input port and said at least one output port are provided in said first plate and the connector are provided in said second plate.

12. A commutator as claimed in claim 10 in which said at least one input port comprises a hole passing through said first plate.

5 13. A commutator as claimed in claim 10 in which the connector comprises a groove in a surface of said second plate.

14. A commutator as claimed in claim 13 in which said groove is a portion of a ring.

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15. A commutator as claimed in claim 10 in which said first and second plates are arranged to be held concentrically adjacent one another.

15 16. A commutator as claimed in claim 10 in which the commutator is configured to produce a signal indicating the relative position of the first and second plate.

17. A method of initiating a fusion reaction comprising:

providing a commutator arranged to allow a fluid to pass therethrough and;

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passing a fluid through said commutator,

applying an AC voltage to the fluid on a first side of said commutator;

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providing a controller arranged to control said AC voltage such that it has a predetermined relationship to movement of the commutator so as to generate a DC voltage in the fluid on a second side of the commutator; and

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applying the DC voltage to a pair of working electrodes such that an electrochemical reaction is initiated therebetween, with said electrochemical reaction being capable of establishing a fusion reaction.

18. A method of plating a component comprising:

providing a commutator arranged to allow a fluid to pass therethrough;

5 passing a fluid through said commutator applying an AC voltage to the fluid
on a first side of the commutator;

providing a controller arranged to control said AC voltage such that it has a
predetermined relationship to movement of said commutator so as to generate
a DC voltage in the fluid on a second side of said commutator; and

10 providing a pair of working electrodes immersed in the fluid and situating the
component therebetween

15 applying said DC voltage to said pair of working electrodes such that an
electrochemical reaction is initiated therebetween with said electrochemical
reaction causing the component to be plated.

19. An electrode comprising an electrode conductor, a gas porous membrane
associated with a porous backing such that a space is created that is capable of
20 allowing a fluid to flow therein between said electrode conductor and said gas
porous membrane.

20. An electrode as claimed in claim 19 in which said gas porous membrane is
mounted upon said porous backing.